TOSHIBA

OUTDOOR UNIT INSTALLATION MANUAL
MANUEL D'INSTALLATION DE L'UNITE EXTERIEURE
INSTALLATIONSHANDBUCH AUSSENEINHEIT
MANUALE D'INSTALLAZIONE DELL'UNITÀ ESTERNA
MANUAL DE INSTALACIÓN DE LA UNIDAD EXTERIOR
MANUAL DE INSTALAÇÃO DA UNIDADE EXTERIOR
INSTALLATIEHANDLEIDING VOOR DE BUITENUNIT
ΕΓΧΕΙΡΙΔΙΟ ΕΓΚΑΤΑΣΤΑΣΗΣ ΕΞΩΤΕΡΙΚΗΣ ΜΟΝΑΔΑΣ

AIR CONDITIONER (SPLIT TYPE)
CLIMATISEUR (TYPE SPLIT)
KLIMAGERÄT (SPLIT-TYP)
CONDIZIONATORE D'ARIA (TIPO SPLIT)
AIRE ACONDICIONADO (TIPO SPLIT)
AR CONDICIONADO (TIPO SPLIT)
AIRCONDITIONER (GESPLITST TYPE)
ΚΛΙΜΑΤΙΣΤΙΚΟ (ΤΥΠΟΣ SPLIT)

Not accessible to the general public
Vente interdite au grand public
Kein öffentlicher Zugang
Non accessibile a clienti generici
No destinado al público en general
Não acessível ao público em geral
Niet geschikt voor huishoudelijk gebruik
Μη διαθέσιμο στο ευρύ κοινό

Heat Pump Model
Modèle à thermopompe
Geräte mit Heizung
Modello con pompa di riscaldamento
Modelo con bomba de calor
Modelo de bomba térmica
Model met warmtepomp
Μοντέλο με Αντλία Θερμότητας

RAV-SM563AT-E
RAV-SM803AT-E

Please read this Installation Manual carefully before installing the Air Conditioner.
- **This Manual describes the installation method of the outdoor unit.**
- **For installation of the indoor unit, follow the Installation Manual attached to the indoor unit.**

Veuillez lire attentivement ce Manuel d'installation avant d'installer le climatiseur.
- **Ce manuel décrit la procédure d'installation de l'unité intérieure.**
- **Pour installer l'unité extérieure, reportez-vous au Manuel d'installation fourni avec l'unité extérieure.**

Bitte lesen Sie dieses Handbuch sorgfältig, bevor Sie mit der Installation des Klimagerätes beginnen.
- **In diesem Handbuch wird die Installation der Außeneinheit beschrieben.**
- **Verwenden Sie zu Installation der Inneneinheiten das entsprechende Handbuch.**

Prima di eseguire l'installazione del condizionatore d'aria, leggere attentamente il Manuale d'installazione.
- **Questo manaule il metodo d'installazione dell'unità esterna.**
- **Per l'installazione dell'unità interna, fare riferimento al Manuale d'installazione fornito con l'unità interna.**

Lea este manual de instalación detenidamente antes de instalar el aparato de Aire Acondicionado
- **Este manual describe el procedimiento de instalación de la unidad de exterior**
- **Si desea instalar la unidad de interior, consulte el Manual de Instalación que se adjunta con dicha unidad.**

Leia atentamente o presente Manual de Instalação antes de instalar o Ar Condicionado.
- **O presente manual descreve o método de instalar a unidade exterior.**
- **Para a instalação de uma unidade interior, siga o Manual de Instalação que acompanha a unidade interior.**

Lees deze installatiehandleiding zorgvuldig door voordat u de airconditioner gaat installeren.
- **Deze handleiding beschrijft de installatiemethode van de buitenunit.**
- **Meer informatie over het installeren van de binnenunit vindt u in de installatiehandleiding van de binnenunit.**

Παρακαλώ διαβάστε προσεχτικά το Εγχειρίδιο Εγκατάστασης πριν από την εγκατάσταση του Κλιματιστικού.
- **Το παρόν Εγχειρίδιο περιγράφει τη μέθοδο εγκατάστασης της εξωτερικής μονάδας.**
- **Για την εγκατάσταση της εσωτερικής μονάδας, ακολουθήστε το Εγχειρίδιο Εγκατάστασης που συνοδεύει την εσωτερική μονάδα.**

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ΕΛΛΗΝΙΚΑ

1 PRECAUTIONS FOR SAFETY

- Ensure that all Local, National and International regulations are satisfied.
- Read this "PRECAUTIONS FOR SAFETY" carefully before Installation.
- The precautions described below include the important items regarding safety. Observe them without fail.
- After the installation work, perform a trial operation to check for any problem.
  Follow the Owner's Manual to explain how to use and maintain the unit to the customer.
- Turn off the main power supply switch (or breaker) before the unit maintenance.
- Ask the customer to keep the Installation Manual together with the Owner's Manual.

CAUTION **New Refrigerant Air Conditioner Installation**

- **THIS AIR CONDITIONER ADOPTS THE NEW HFC REFRIGERANT (R410A) WHICH DOES NOT DESTROY OZONE LAYER.**

The characteristics of R410A refrigerant are ; easy to absorb water, oxidizing membrane or oil, and its pressure is approx. 1.6 times higher than that of refrigerant R22. Accompanied with the new refrigerant, refrigerating oil has also been changed. Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigerating oil does not enter the refrigerating cycle.

To prevent charging an incorrect refrigerant and refrigerating oil, the sizes of connecting sections of charging port of the main unit and installation tools are charged from those for the conventional refrigerant.

Accordingly the exclusive tools are required for the new refrigerant (R410A).

For connecting pipes, use new and clean piping designed for R410A, and please care so that water or dust does not enter. Moreover, do not use the existing piping because there are problems with pressure-resistance force and impurity in it.

CAUTION **To Disconnect the Appliance from Main Power Supply**

This appliance must be connected to the main power supply by means of a switch with a contact separation of at least 3 mm.

The installation fuse 16 A (All type fuse can be used) must be used for the power supply line of this conditioner.

⚠ WARNING

- **Ask an authorized dealer or qualified installation professional to install/maintain the air conditioner.**
  Inappropriate installation may result in water leakage, electric shock or fire.
- **Turn off the main power supply switch or breaker before attempting any electrical work.**
  Make sure all power switches are off. Failure to do so may cause electric shock.
- **Connect the connecting wire correctly.**
  If the connecting wire is connected in a wrong way, electric parts may be damaged.
- **When moving the air conditioner for the installation into another place, be very careful not to enter any gaseous matter other than the specified refrigerant into the refrigeration cycle.**
  If air or any other gas is mixed in the refrigerant, the gas pressure in the refrigeration cycle becomes abnormally high and it may resultingly causes pipe burst and injuries on persons.
- **Do not modify this unit by removing any of the safety guards or by by-passing any of the safety interlock switches.**
- **Exposure of unit to water or other moisture before installation may cause short-circuit of electrical parts.**
  Do not store it in a wet basement or expose to rain or water.

- **After unpacking the unit, examine it carefully if there are possible damage.**
- **Do not install in a place that might increase the vibration of the unit.**
- **To avoid personal injury (with sharp edges), be careful when handling parts.**
- **Perform installation work properly according to the Installation Manual.**
  Inappropriate installation may result in water leakage, electric shock or fire.
- **When the air conditioner is installed in a small room, provide appropriate measures to ensure that the concentration of refrigerant leakage occur in the room does not exceed the critical level.**
- **Install the air conditioner securely in a location where the base can sustain the weight adequately.**
- **Perform the specified installation work to guard against an earthquake.**
  If the air conditioner is not installed appropriately, accidents may occur due to the falling unit.
- **If refrigerant gas has leaked during the installation work, ventilate the room immediately.**
  If the leaked refrigerant gas comes in contact with fire, noxious gas may generate.
- **After the installation work, confirm that refrigerant gas does not leak.**
  If refrigerant gas leaks into the room and flows near a fire source, such as a cooking range, noxious gas might generate.
- **Electrical work must be performed by a qualified electrician in accordance with the Installation Manual. Make sure the air conditioner uses an exclusive power supply.**
  An insufficient power supply capacity or inappropriate installation may cause fire.
- **Use the specified wires for wiring connect the terminals securely fix. To prevent external forces applied to the terminals from affecting the terminals.**
- **Be sure to provide grounding.**
  Do not connect ground wires to gas pipes, water pipes, lightning rods or ground wires for telephone wires.
- **Conform to the regulations of the local electric company when wiring the power supply.**
  Inappropriate grounding may cause electric shock.
- **Do not install the air conditioner in a location subject to a risk of exposure to a combustible gas.**
  If a combustible gas leaks, and stays around the unit, a fire may occur.

Required tools for installation work

1) Philips screwdriver
2) Hole core drill (65 mm)
3) Spanner
4) Pipe cutter
5) Knife
6) Reamer
7) Gas leak detector
8) Tape measure
9) Thermometer
10) Mega-tester
11) Electro circuit tester
12) Hexagonal wrench
13) Flare tool
14) Pipe bender
15) Level vial
16) Metal saw

R410A (Special requirement)

17) Gauge manifold
    (Charge hose : R410A special requirement)
18) Vacuum pump
    (Charge hose : R410A special requirement)
19) Torque wrench
    1/4 (17 mm) 16 N•m (1.6 kgf•m)
    3/8 (22 mm) 42 N•m (4.2 kgf•m)
    1/2 (26 mm) 55 N•m (5.5 kgf•m)
    5/8 (15.9 mm) 120 N•m (12.0 kgf•m)
20) Copper pipe gauge adjusting projection margin
21) Vacuum pump adapter

2 ACCESSORY AND REFRIGERANT

Accessory and Installation Parts

①

Outdoor unit Installation manual × 1

②

Waterproof rubber cap Drain nipple

Refrigerant Piping

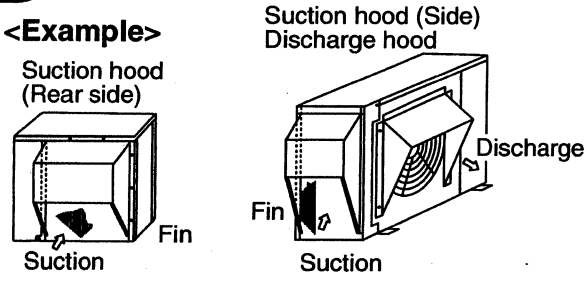
- Piping kit used for the conventional refrigerant cannot be used.
- Use copper pipe with 0.8 mm or more thickness for Ø6.4, Ø9.5, Ø12.7.
  Use copper pipe with 1.0 mm or more thickness for Ø15.9.
- Flare nut and flare works are also different from those of the conventional refrigerant.
  Take out the flare nut attached to the main unit of the air conditioner, and use it.

3 SELECTION OF INSTALLATION

CAUTION

When using an air conditioner under low outside temperature condition (Outside temp.:–5 °C or lower) with COOL mode, prepare a duct or wind shield so that it is not affected by the wind.

<Example>



Before installation

Be careful to the following items before installation.

Length of refrigerant pipe

<SM56>

Length of refrigerant pipe connected to indoor/outdoor unit	Item
5 m to 20 m	Addition of refrigerant is unnecessary at the local site.
*21 m to 30 m	<Addition of refrigerant> Add 20 g of refrigerant for every 1 m of pipe which exceeds 20 m.

* Caution at addition of refrigerant
When the total length of refrigerant pipe exceeds 20 m, add 20 g/m of refrigerant and the maximum total length of pipe is 30 m.
(Max. amount of additional refrigerant is 200 g.)
Charge the refrigerant accurately. Overcharge may cause a serious trouble of compressor.

<SM80>

Length of refrigerant pipe connected to indoor/outdoor unit	Item
5 m to 20 m	Addition of refrigerant is unnecessary at the local site.
*21 m to 30 m	<Addition of refrigerant> Add 40 g of refrigerant for every 1 m of pipe which exceeds 20 m.

* Caution at addition of refrigerant
When the total length of refrigerant pipe exceeds 20 m, add 40 g/m of refrigerant and the maximum total length of pipe is 30 m.
(Max. amount of additional refrigerant is 400 g.)
Charge the refrigerant accurately. Overcharge may cause a serious trouble of compressor.

Air purge

- For air purge, use a vacuum pump.
- Do not use refrigerant charged in the outdoor unit for air purge. (The refrigerant for air purge is not contained in the outdoor unit.)

Electrical wiring

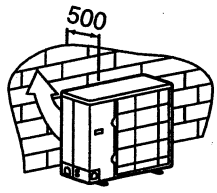
- Be sure to fix the power wires and indoor/outdoor connecting wires with clamps so that they do not contact with the cabinet, etc.

Installation Place

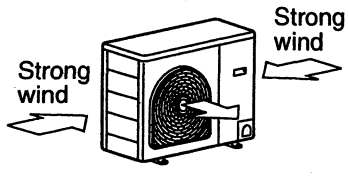
- A place which provides a specified space around the outdoor unit.
- A place where the operation noise and discharged air are not given to your neighbors.
- A place that is not exposed to a strong wind.
- A place that does not block a passage.
- When the outdoor unit is installed in an elevated position, be sure to secure its feet.
- There must be sufficient space for carrying in the unit.
- A place where the drain water does not make any problem.

CAUTION

1. Install the outdoor unit at a place where discharge air is not blocked.
2. When an outdoor unit is installed in a place that is always exposed to a strong wind like a coast or on a high story of a building, secure a normal fan operation by using a duct or a wind shield.
3. When installing the outdoor unit in a place that is constantly exposed to a strong wind such as the upper stairs or rooftop of a building, apply the windproof measures referring to the following examples.
   1) Install the unit so that its discharge port faces to the wall of the building. Keep a distance 500 mm or more between the unit and the wall surface.



   2) Supposing the wind direction during the operation season of the air conditioner, install the unit so that the discharge port is set at right angle to the wind direction.



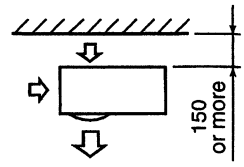
4. Installation in the following places may result in some troubles. Do not install the unit in such places below.
   - A place full of machine oil.
   - A place full of sulfuric gas.
   - A place where high-frequency radio waves are likely to be generated as from audio equipment, welders, and medical equipment.

Necessary Space for Installation

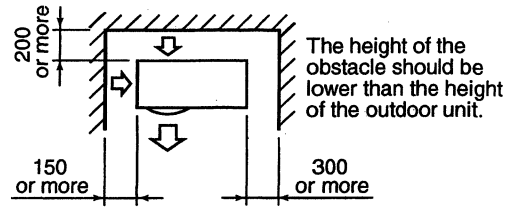
Obstacle at rear side

<Upper side is free>

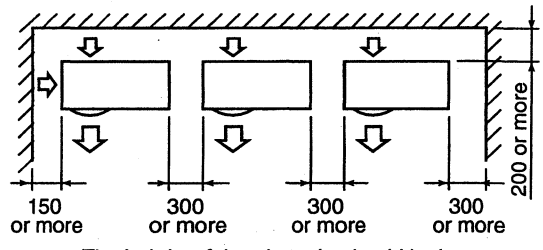
1. Single unit installation



2. Obstacles at both right and left sides.

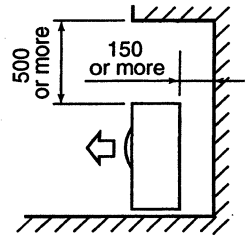


3. Serial installation of two or more units



The height of the obstacle should be lower than the height of the outdoor unit.

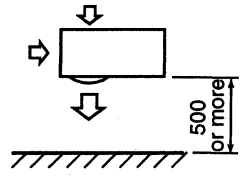
<Obstacle also at the upper side>



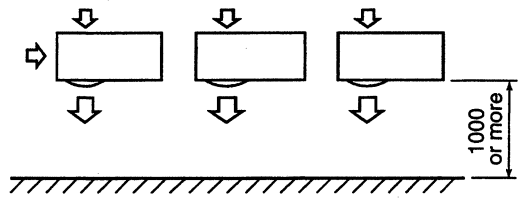
Obstacle at front side

<Upper side is free>

1. Single unit installation

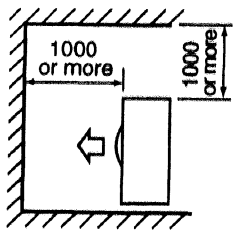


2. Serial installation of two or more units



3 SELECTION OF INSTALLATION

<Obstacle also at the upper side>

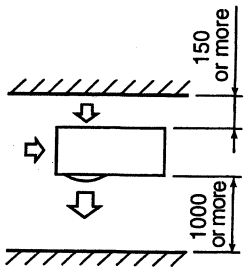


Obstacles at both front and rear sides

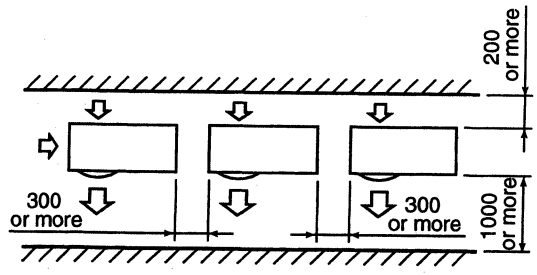
Open the upper side and both right and left sides. The height of obstacle at both front and rear side, should be lower than the height of the outdoor unit.

<Standard installation>

1. Single unit installation



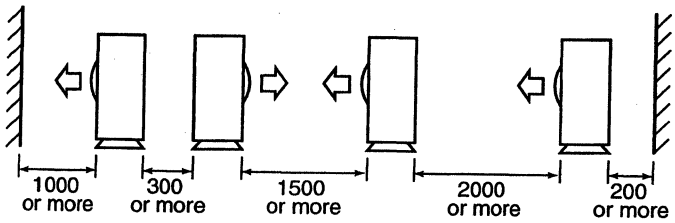
2. Serial installation of two or more units



Serial installation at front and rear sides

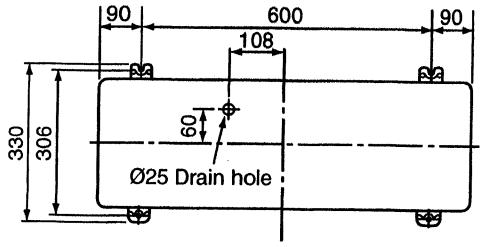
Open the upper side and both right and left sides. The height of obstacle at both front and rear sides should be lower than the height of the outdoor unit.

<Standard installation>

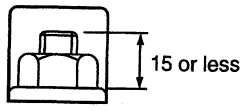


Installation of Outdoor Unit

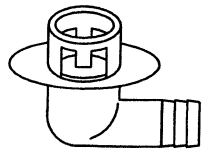
- Before installation, check strength and horizontality of the base so that abnormal sound does not generate.
- According to the following base diagram, fix the base firmly with the anchor bolts.
  (Anchor bolt, nut: M10 x 4 pairs)



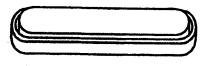
Set the out margin of the anchor bolt to 15 mm or less.



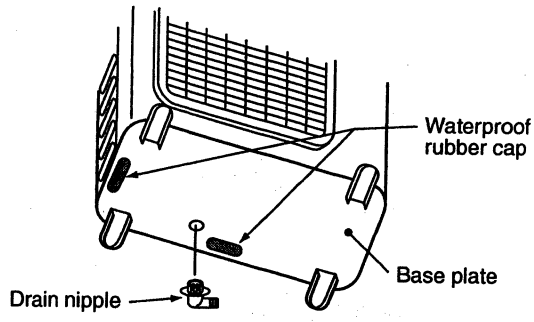
- In case of draining through the drain hose, attach the following drain nipple and the waterproof rubber cap, and use the drain hose (Inner diam.: 16 mm) sold on the market. And also seal the screws securely with silicone material, etc. so that water does not drop down. Some conditions may cause dewing or dripping of water.



Drain nipple



Waterproof rubber cap



For Reference

If a heating operation would be continuously performed for a long time under the condition that the outdoor temperature is 0 °C or lower, draining of defrosted water may be difficult due to freezing of the bottom plate, resulting in a trouble of the cabinet or fan.

It is recommended to procure an anti-freeze heater locally for a safety installation of the air conditioner.

For details, contact the dealer.

Optional Installation Parts (Local Procure)

	Parts name	Q'ty
A	Refrigerant piping Liquid side : Ø6.4 mm or Ø9.5 mm Gas side : Ø12.7 mm or Ø15.9 mm	Each one
B	Pipe insulating material (polyethylene foam, 6 mm thick)	1
C	Putty, PVC tapes	Each one

Refrigerant Piping Connection

<Piping connection>

Capacity rank RAV-	Liquid side		Gas side	
	Outer diameter	Thickness	Outer diameter	Thickness
SM56	Ø6.4	0.8	Ø12.7	0.8
SM80	Ø9.5	0.8	Ø15.9	1.0

CAUTION

TAKE NOTICE THESE IMPORTANT 4 POINTS BELOW FOR PIPING WORK

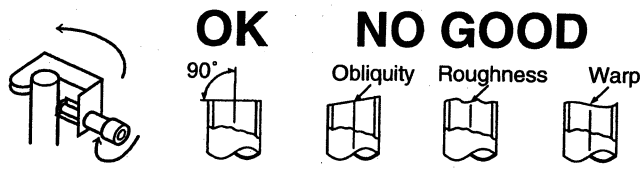
1. Keep dust and moisture away from inside the connecting pipes.
2. Tightly connect the connection between pipes and the unit.
3. Evacuate the air in the connecting pipes using VACUUM PUMP.
4. Check gas leak at connected points.

4 REFRIGERANT PIPING

For the information for works (Re-use of the existing pipes), refer to Appendix in page 8.

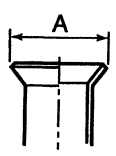
Flaring

1. Cut the pipe with a pipe cutter.



2. Insert a flare nut into the pipe, and flare the pipe.
   As the flaring sizes of R410A differ from those of refrigerant R22, the flare tools newly manufactured for R410A are recommended. However, the conventional tools can be used by adjusting projection margin of the copper pipe.

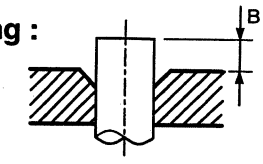
• Flaring size : A (Unit : mm)



Outer diam. of copper pipe	A $^{+0}_{-0.4}$	
	R410A	R22
6.4	9.1	9.0
9.5	13.2	13.0
12.7	16.6	16.2
15.9	19.7	19.4

* In case of flaring for R410A with the conventional flare tool, pull it out approx. 0.5 mm more than that of R22 to adjust to the specified flare size.
The copper pipe gauge is useful for adjusting projection margin size.

• Projection margin in flaring : B (Unit : mm)



Rigid (Clutch type)

Outer diam. of copper pipe	R410A tool used		Conventional tool used	
	R410A	R22	R410A	R22
6.4	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0
9.5	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0
12.7	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0
15.9	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0

Imperial (Wing nut type)

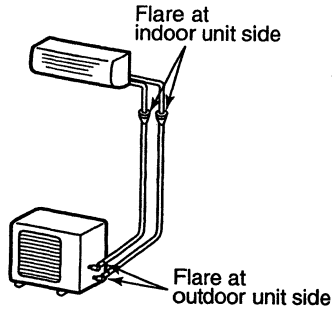
Outer diam. of copper pipe	R410A	R22
6.4	1.5 to 2.0	1.0 to 1.5
9.5	1.5 to 2.0	1.0 to 1.5
12.7	2.0 to 2.5	1.5 to 2.0
15.9	2.0 to 2.5	1.5 to 2.0

4 REFRIGERANT PIPING

Tightening of Connecting Part

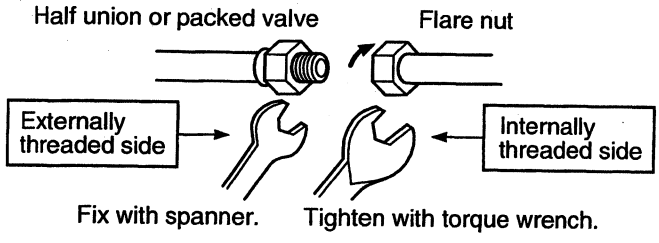
(Unit: N•m)

Outer diam. of copper pipe	Tightening torque
6.4 mm (diam.)	14 to 18 (1.4 to 1.8 kgf•m)
9.5 mm (diam.)	33 to 42 (3.3 to 4.2 kgf•m)
12.7 mm (diam.)	50 to 62 (5.0 to 6.2 kgf•m)
15.9 mm (diam.)	68 to 82 (6.8 to 8.2 kgf•m)



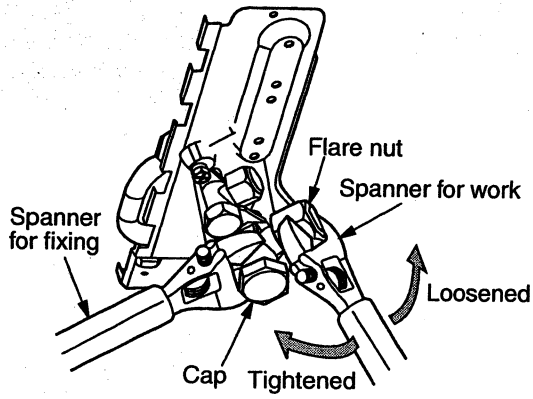
- Align the centers of the connecting pipes and tighten the flare nut strong as far as possible with your fingers.

  Then fix the nut with a spanner and tighten it with torque wrench as shown in the figure.



- As shown in the figure, be sure to use a double spanner to loosen or tighten the flare nut of the valve at gas side. If using a single spanner, the nut cannot be tightened with necessary tightening torque.

  On the contrary, use a single spanner to loosen or tighten the flare nut of the valve at liquid side.



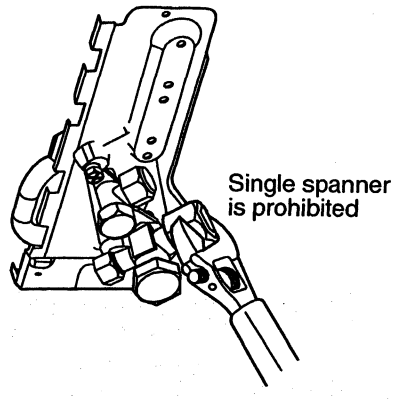
SM80 type valve at gas side

REQUIREMENT

1. Do not put the spanner on the cap. The valve may be broken.
2. If applying excessive torque, the nut may be broken according to some installation conditions.

- After the installation work, be sure to check gas leak of connecting part of the pipes with nitrogen.

NO GOOD



- Pressure of R410A is higher than that of R22 (Approx. 1.6 times). Therefore, using a torque wrench, tighten the flare pipe connecting sections which connect the indoor/outdoor units at the specified tightening torque. Incomplete connections may cause not only a gas leak, but also a trouble of the refrigeration cycle.

Do not apply refrigerating machine oil to the flared surface.

Appendix

Instruction of Works:
The existing R22 and R407C piping can be reused for our digital inverter R410A products installations.

NOTE)

Confirmation of existence of scratch or dent of the former pipes to be applied and also confirmation of reliability of the pipe strength are conventionally referred to the local site.

If the definite conditions can be cleared, it is possible to update the existing R22 and R407C pipes to those for R410A models.

[Basic conditions need to reuse the existing pipe]

Check and observe three conditions of the refrigerant piping works.

1. **Dry** (There is no moisture inside of the pipes.)
2. **Clean** (There is no dust inside of the pipes.)
3. **Tight** (There is no refrigerant leak.)

[Restricted items to use the existing pipes]

In the following cases, the existing pipes cannot be reused as they are. Clean the existing pipes or exchange them with new pipes.

1. When a scratch or dent is heavy, be sure to use the new pipes for the works.
2. When the thickness of the existing pipe is thinner than the specified "Pipe diameter and thickness" be sure to use the new pipes for the works.
   - The operating pressure of R410A is high (1.6 times of R22 and R407C). If there is a scratch or dent on the pipe or thinner pipe is used, the pressure strength is poor and may cause breakage of the pipe at the worst.

* Pipe diameter and thickness (mm)

Pipe outer diameter		Ø6.4	Ø9.5	Ø12.7	Ø15.9	Ø19.0
Thickness	R410A	0.8	0.8	0.8	1.0	1.0
	R22 (R407C)					

- In case that the pipe diameter is Ø12.7 mm or less and the thickness is less than 0.7 mm, be sure to use the new pipes for works.

3. The pipes are left as coming out or gas leaks. (Poor refrigerant)
   - There is possibility that rain water or air including moisture enters in the pipe.
4. Refrigerant recovery is impossible. (Refrigerant recovery by the pump-down operation on the existing air conditioner)
   - There is possibility that a large quantity of poor oil or moisture remains inside of the pipe.
5. A dryer on the market is attached to the existing pipes.
   - There is possibility that copper green rust generated.
6. Check the oil when the existing air conditioner was removed after refrigerant had been recovered. In this case, if the oil is judged as clearly different compared with normal oil
   - The refrigerator oil is copper rust green : There is possibility that moisture is mixed with the oil and rust generates inside of the pipe.
   - There is discolored oil, a large quantity of the remains, or bad smell.
   - A large quantity of sparkle remained wear-out powder is observed in the refrigerator oil.
7. The air conditioner which compressor was exchanged due to a faulty compressor. When the discolored oil, a large quantity of the remains, mixture of foreign matter, or a large quantity of sparkle remained wear-out powder is observed, the cause of trouble will occur.
8. Installation and removal of the air conditioner are repeated with temporary installation by lease and etc.
9. In case that type of the refrigerator oil of the existing air conditioner is other than the following oil (Mineral oil), Suniso, Freol-S, MS (Synthetic oil), alkyl benzene (HAB, Barrel-freeze), ester series, PVE only of ether series.
   - Winding-insulation of the compressor may become inferior.

NOTE)

The above descriptions are results of confirmation by our company and they are views on our air conditioners, but they do not guarantee the use of the existing pipes of the air conditioner that adopted R410A in other companies.

[Branching pipe for simultaneous operation system]

- In the concurrent twin system, when TOSHIBA-specified branching pipe is used, it can be reused. Branching pipe model name: RBC-TWP30E-2, RBC-TWP50E-2 On the existing air conditioner for simultaneous operation system (twin system), there is a case of using branch pipe that has insufficient compressive strength. In this case please change it to the branch pipe for R410A.

[Curing of pipes]

When removing and opening the indoor unit or outdoor unit for a long time, cure the pipes as follows:

- Otherwise rust may generate when moisture or foreign matter due to dewing enters in the pipes.
- The rust cannot be removed by cleaning, and a new piping work is necessary.

Place position	Term	Curing manner
Outdoors	1 month or more	Pinching
	Less than 1 month	Pinching or taping
Indoors	Every time	

5 EVACUATING

Air Purge

This air conditioner can be installed up to the connecting pipe length and height difference in the following table.

Capacity rank	Max. connecting pipe length (m)	Height difference (m)		Hexagonal wrench size
		Outdoor unit at upper side	Outdoor unit at lower side	
SM56 type	30	30	30	4 mm
SM80 type				6 mm

With respect to the preservation of terrestrial environment, adopt "Vacuum pump" for air purge (Evacuate air in the connecting pipes) when installing the unit.

- Do not discharge the refrigerant gas to the atmosphere to preserve the terrestrial environment.
- Use a vacuum pump to discharge the air (nitrogen, etc.) remained in the set. If the air remains, the capacity may decrease.

For the vacuum pump, be sure to use one with backflow preventer so that the oil in the pump does not backflow into the pipe of the air conditioner when the pump stops. (If oil in the vacuum pump is put in an air conditioner including R410A, it may cause trouble on the refrigeration cycle.)

Vacuum pump

As shown in the figure, connect the charge hose after the manifold valve are closed completely.

↓

Attach the connecting port of the charge hose with a projection to push the valve core (setting pin) to the charge port of the set.

↓

Open the handle Low fully.

↓

Turn ON the vacuum pump (*1)

↓

Loosen the flare nut of the packed valve (Gas side) a little to check the air passes through. (*2)

↓

Tighten the flare nut again.

↓

Execute vacuuming until the compound pressure gauge indicates –101 kPa (–76 cmHg). (*1)

↓

Close handle Low completely.

↓

Turn OFF the vacuum pump.

↓

Leave the vacuum pump as it is for 1 or 2 minutes, and check the indicator of the compound pressure gauge does not return.

↓

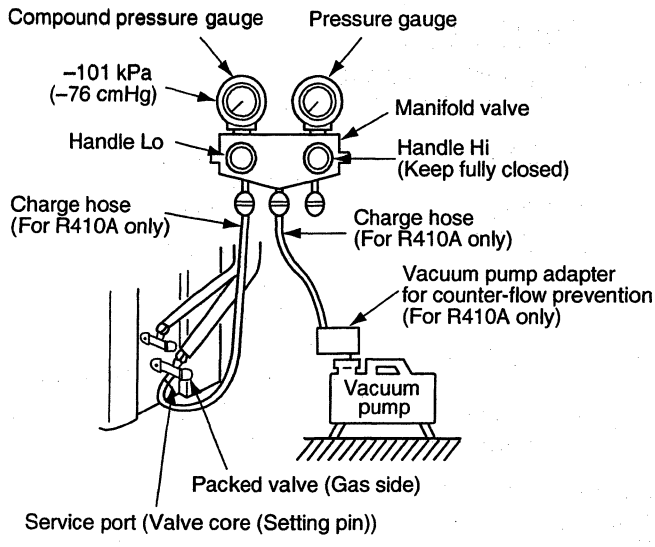
Open fully the valve stem or the valve handle. (First, at liquid side, then gas side)

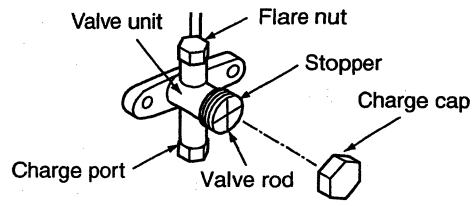
↓

Disconnect the charge hose from the charge port.

↓

Tighten valve and caps of the charge port surely.





*1. Use the vacuum pump, vacuum pump adapters, and gauge manifold referring to the manuals attached to each tool before using them. For the vacuum pump, check oil is filled up to the specified line of the oil gauge.

*2. While the air is purged, check again that the connecting port of charge hose, which has a projection to push the valve core, is firmly connected to the charge port.

Valve handling precautions

- Open the valve stem or the handle until it strikes the stopper. It is unnecessary to apply further force.
- Securely tighten the cap with a torque wrench.
- Cap tightening torque

Valve size	Ø6.4	14 to 18 N•m (1.4 to 1.8 kgf•m)
	Ø9.5	33 to 42 N•m (3.3 to 4.2 kgf•m)
	Ø12.7	50 to 62 N•m (5.0 to 6.2 kgf•m)
	Ø15.9	68 to 82 N•m (6.8 to 8.2 kgf•m)
Charge port		14 to 18 N•m (1.4 to 1.8 kgf•m)

6 ELECTRICAL WORK

For the air conditioner that has no power wire, connect a power wire as mentioned below.

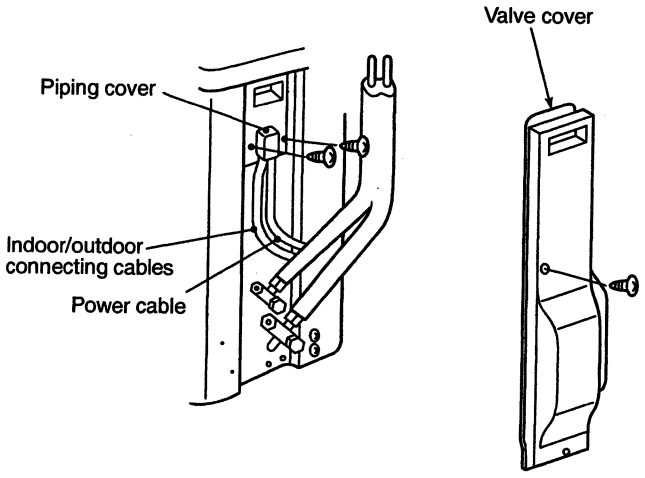
Model	RAV-SM56, RAV-SM80
Power supply	220 – 240 V Single phase 50 Hz
Maximum running current	15 A
Installation fuse rating	16 A (all types can be used)
Power wire	H07 RN-F or 60245 IEC 66 (1.5 mm² or more)

CAUTION

- Wrong wiring may cause a burnout to some electrical parts.
- Be sure to use the cord clamps attached to the product.
- Do not damage or scratch the conductive core and inner insulator of power and inter-connecting wires when peeling them.
- Be sure to comply with local regulations of the wire from outdoor unit to indoor unit. (wire size and wiring method etc.)
- Use the power and Inter-connecting wires with specified thickness, specified type and protective devices required.

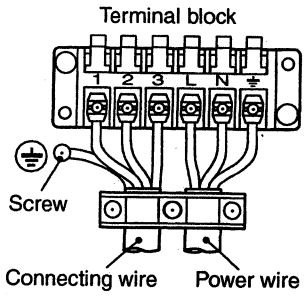
How to remove the valve cover

1. Remove screws of the valve cover.
2. Pull the valve cover downward to remove it.

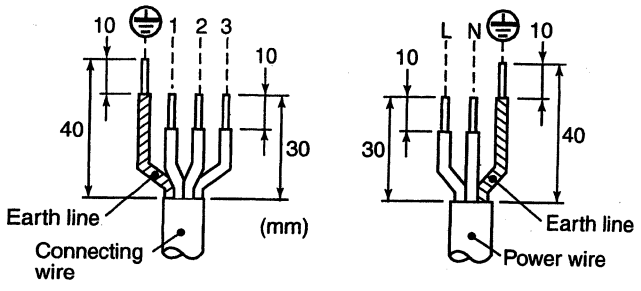


How to wire

1. Connect the connecting wire to the terminal as identified with their respective numbers on the terminal block of indoor and outdoor unit. H07 RN-F or 60245 IEC 66 (1.5 mm² or more)
2. When connecting the connecting wire to the outdoor unit terminal, prevent water coming in the outdoor unit.
3. Insulate the unsheathed cords (conductors) with electrical insulation tape. Process them so that they do not touch any electrical or metal parts.
4. For inter connecting wire, do not use a wire jointed to another on the way.
   Use wires long enough to cover the entire length.



Tripping length power cord and connecting wire



CAUTION

- The installation fuse must be used for the power supply line of this air conditioner.
- Incorrect/incomplete wiring might cause an electrical fire or smoke.
- Prepare the exclusive power supply for the air conditioner.
- This product can be connected to the mains.
  Connection to the fixed wiring :
  A switch which disconnects all poles and has a contact separation of at least 3 mm must be incorporated in the fixed wiring.

7 FINAL INSTALLATION CHECKS

Check and Test Operation

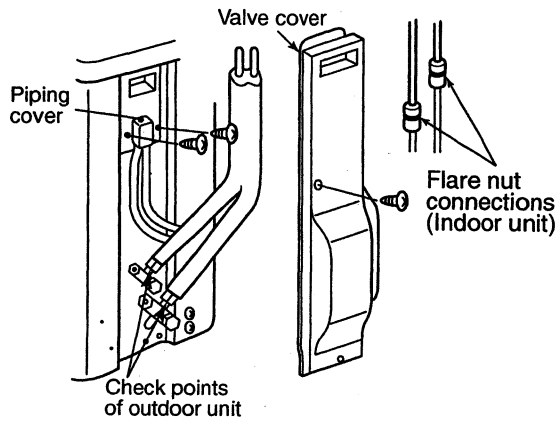
For R410A, use the leak detector exclusively manufactured for HFC refrigerant (R410A, R134a, etc.).

* The conventional leak detector for HCFC refrigerant (R22, etc.) cannot be used because its sensitivity for HFC refrigerant lowers to approx. 1/40.

- Pressure of R410A is approx. 1.6 times higher than that of R22.

  If installation work is incompletely finished, a gas leakage may occur when pressure rises during operation.

  Therefore, be sure to test the piping connections for leakage.
- Check gas leakage at the flare nut connections, valve stem cap connections and service port cap fittings with a leak detector or soap water.



CAUTION

When the remote controller is used for the first time, it accepts an operation approx. 5 minutes after the power supply has been turned on.

It is not a trouble, but is because the setup of the remote controller is being checked.

For the second power-ON time and after, approx. 1 minute is required to start the operation by the remote controller.

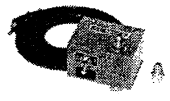
Installation/Servicing Tools

Changes in the product and components

In the case of an air conditioner using R410A, in order to prevent any other refrigerant from being charged accidentally, service port diameter of the outdoor unit control valve (3 way valve) has been changed. (1/2 UNF 20 threads per inch)

- In order to increase the pressure resisting strength of the refrigerant piping flare processing diameter and size of opposite side of flare nuts has been changed. (for copper pipes with nominal dimensions 1/2 and 5/8)

New tools for R410A

New tools for R410A	Appliwire to R22 model		Changes
Gauge manifold	×		As pressure is high, it is impossible to measure by means of conventional gauge. In order to prevent any other refrigerant from being charged, each port diameter is changed.
Charge hose	×		In order to increase pressure resisting strength, hose materials and port size are changed (to 1/2 UNF 20 threads per inch). When purchasing a charge hose, be sure to check the port size.
Electronic balance for refrigerant charging	○		As pressure is high and gasification speed is fast, it is difficult to read the indicated value by means of charging cylinder, as air bubbles occur.
Torque wrench (nominal diam. 1/2, 5/8)	×		The sizes of opposite sides of flare nuts have been increased. Incidentally, a common wrench is used for nominal diameters 1/4 and 3/8.
Flare tool (clutch type)	○		By increasing the clamp bar's receiving hole, strength of spring in the tool has been improved.
Gauge for projection adjustment	—	—	Used when flare is made with using conventional flare tool.
Vacuum pump adapter	○		Connected to the conventional vacuum pump. It is necessary to use an adapter to prevent vacuum pump oil from flowing back to the charge hose. The charge hose connecting part has two ports - one for conventional refrigerant (7/16 UNF 20 threads per inch) and the other for R410A. If the vacuum pump oil (mineral) mixes with R410A, sludge may occur and damage the equipment.
Gas leakage detector	×		Exclusive for HFC refrigerant.

- Incidentally, the "refrigerant cylinder" comes with the refrigerant designation (R410A) and protector coating in the U.S.'s ARI specified rose color (ARI color code: PMS 507).
- Also, the "charge port and packing for refrigerant cylinder" require 1/2 UNF 20 threads per inch corresponding to the charge hose's port size.

7 FINAL INSTALLATION CHECKS

Is there no scratch or dent on the existing pipes?

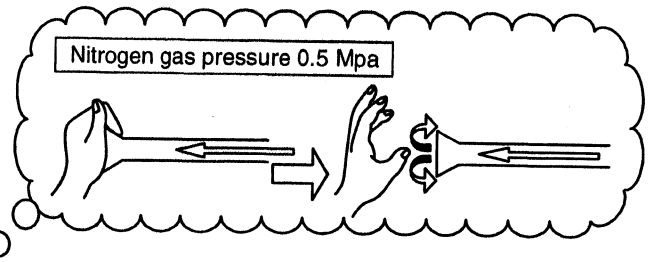
→ Existing pipe: NO * Use a new pipes.

Is it possible to operate the existing air conditioner?

NO →

YES ↓

* After the existing air conditioner operated in cooling mode for approx. 30 minutes or longer*, recover the refrigerant.
* For cleaning the pipes and recovering of oil
  • Refrigerant recovery: Pump down method



* Remove the existing air conditioner from the piping and carry out flashing (nitrogen pressure 0.5 Mpa) to remove the remains inside of the pipe.
  Note] In case of twin, also be sure to flash the branching pipe.

(If there is discharge of remains, it is judged that there is a large quantity of remains.)

Was not largely discolored oil or a large quantity of remains discharged? (When the oil deteriorates, the color of the oil changes to muddy and black color.)

NO → Clean the pipes or use the new pipes.

YES ↓

■ Connect the indoor/outdoor units to the existing pipe.
  • Use a flare nut attached to the main unit for the indoor/outdoor units.
    (Do not use the flare nut of the existing pipe.)
  • Re-machine the flare machining size to size for R410A.

■ In case that the gas pipe Ø19 mm is used for the outdoor unit of SM803 (3 HP) or higher:
(Gas pipe size of our R410A model 3 to 5 HP is Ø15.9 mm)
→ Turn the existing pipe switch on the cycle control P.C board of the outdoor unit to ON side.
At shipment from factory OFF → ON for existing pipe (Refer to the table below.) (Be sure to set the contents in the table below in order to restrict the refrigerating cycle pressure of the equipment in the pipe standard.)

Existing pipe SW

	Switch
3 HP	Bit 3 of SW801
4, 5 HP	Bit 5 of SW801

* (Airtight test), Vacuum dry, Refrigerant charge, Gas leak check

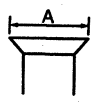
Trial run

Piping necessary to change the flare nut/ machining size due to pipe compression.

1) Flare nut width: H (mm)

Copper pipe outer dia.	Ø6.4	Ø9.5	Ø12.7	Ø15.9	Ø19.0
For R410A	17	22	26	29	36
For R22	Same as above		24	27	Same as above

2) Flare machining size: A (mm)



Copper pipe outer dia.	Ø6.4	Ø9.5	Ø12.7	Ø15.9	Ø19.0
For R410A	9.1	13.2	16.6	19.7	24.0
For R22	9.0	13.0	16.2	19.4	23.3

Becomes large a little for R410A

Do not apply the refrigerator oil to the flare surface.

Recovery method of refrigerant

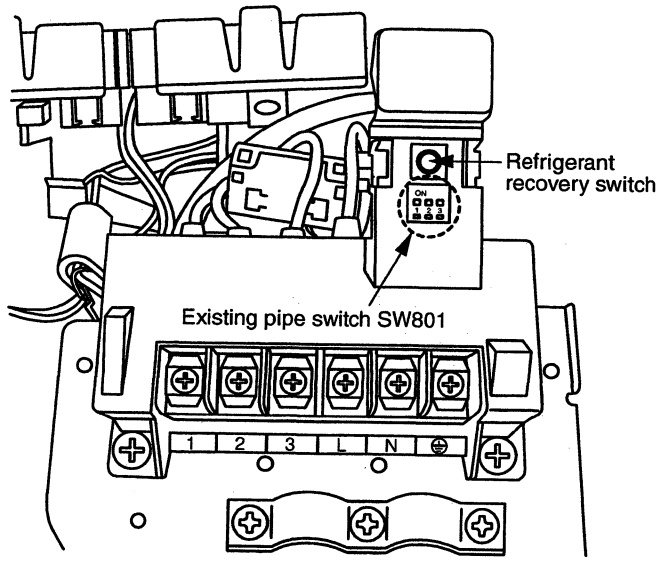
- When recovering refrigerant in case of reinstallation of the indoor or outdoor unit, etc., use the refrigerant recovery switch on the terminal block of the outdoor unit.

Work procedure

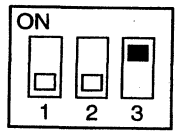
1. Turn on the power supply.
2. Using the remote controller, set FAN operation to the indoor unit.
3. Pushing the refrigerant recovery switch on the terminal block of the outdoor unit starts the forced cooling operation. (Max. 10 minutes), and then the refrigerant is recovered by operation of the valve.
4. After recovery of the refrigerant, push the refrigerant recovery switch together with closing the valve. The operation stops.
5. Turn off the power supply.

DANGER

Take care for an electric shock because the control P.C. board is electrified.



Only when the existing gas pipe Ø19 mm is used on RAV-SM803AT-E model, change the setting of SW801 No. 3.



8 APPLICABLE CONTROL OF OUTDOOR UNIT

You can response to the following items by attaching the parts sold separately "Application control kit" (TCB-PCOS1E).

Demand control

- It saves the capacity of the outdoor unit by outside Demand signal to correspond to the temporary peak cut.
- The capacity saving can be adjusted with three steps, 75 %, 50 %, and operation stop.

Night operation control (Sound reduction)

In order to reduce noise level in the night-time, if incorporating this control with a timer being on the market, the outdoor operating sound level will be reduced by approx. 5 dB in cooling operation.

Compressor operation output

The check of the compressor operation time required of a maintenance etc.

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